



GENERAL ENGINEERING STANDARD

PROJECT TITLE	All Saint-Gobain (S-G) Plants	Revision No	F
PROCESS AREA	All	DOC. NO.	1500-AP0-TSP-GMT-007
EQUIPMENT ITEM	Machine Guarding	SHEET 1 of 5	Rev

1. Description

This standard describes Saint-Gobain's (S-G) requirements for guarding of machinery for all projects.

It is the aim of this standard to describe a minimum level of machine safety which is consistent throughout S-G's operations and complies with local country regulations.

A guard may be of solid construction, but large mesh construction fences may be provided as an alternative where it is not practical to provide individual guarding to each drive. S-G's requirements for fences are described in the Standard "1500-AP0-TSP-GMT-004 Machine Fences".

Where operator access is required inside guards or fences to carry out production related operations, then reference shall be made to the Standard "1500-J00-TSP-GMT-004 Machine Access".

The use of light barriers as guards is described in the Standard "1500-AP0-TSP-GMT-018 Light Barriers".

2. References

The following International and S-G standards shall be applied as part of this standard.

EN 620 :2010 - Continuous Handling Equipment And Systems - Safety and EMC requirements for Fixed Belt Conveyors for Bulk Materials.

ISO 12100: 2010 - Safety of Machinery - Basic concepts, general principles of design

ISO 13854: 2019 - Safety of Machinery - Minimum gaps to avoid crushing of parts of the human body.

ISO 13857: 2019 - Safety of Machinery - Safety distances to prevent danger zones being reached by upper and lower limbs.

ISO 14120: 2014 - Safety of Machinery - Guards - General requirements for the design and construction of fixed and movable guards.

Saint Gobain document 1500-AP0-TSP-GMT-004 Standard for Machine Fences

Saint Gobain document 1500-J00-TSP-GMT-004 Machine Access

Saint Gobain document 1500-AP0-TSP-GMT-013 Visual Standards Manual

Saint Gobain document 1500-AP0-TSP-GMT-018 Light Barriers

3. Design Requirements

3.1 General

All primary drive components (power transmission equipment) shall be guarded.

In some installations S-G the whole machine may be inside a fenced area. If personnel are allowed into the fenced area for production adjustments under the control of interlocked access gates, then the primary drives shall be guarded in addition to having the fence.

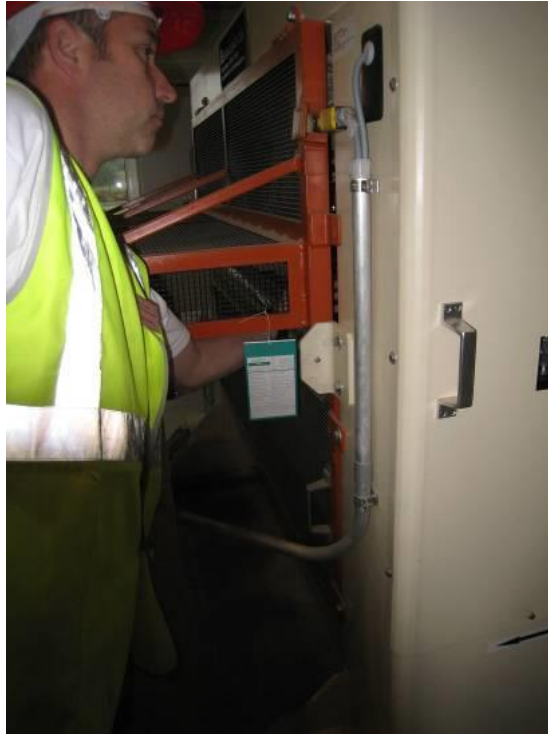
Primary drives and couplings shall be guarded from all directions (including from below).

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Saint-Gobain Technology & Industrial Performance, East Leake, Loughborough, LE12 6JS U.K. Tel: 0115 945 1600

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Example of unacceptable design

Additional areas which present a hazard from snags, shear, entanglements and nips (as defined International Standards referenced in **Section 2**) shall be adequately guarded.

Exposed non-driven ends of rotating shafts or rollers may have protruding parts which can cause personal injury. These shall be guarded (e.g. by the use of bearing end covers).

Guards shall also be provided to prevent debris from falling into drive components for the protection of the drive system.

3.2 Removal of Guarding

Guarding shall not be constructed in large sections which are difficult to remove and handle. Guarding must also require the use of a tool in order to be removed.

A basic specification of this criteria is given below.

Guards should be

- The guarding must weigh less than 20kg
- Designed to be easily removable by one person.
- Screwed fastenings for guards shall be kept to a minimum to easy removal. The careful use of other fixing features such as hooks or pins can reduce the number of screwed fastenings required.

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- In accordance with **ISO 14120**, guards shall fall away from the machine if the fixings are removed in order to make it clearly visible that the guard is incorrectly fitted.

In **exceptional** cases (to be approved by S-G before manufacturing) where there is good access for two people in the anticipated system layout, then guarding of less than 40 kg which requires a two-person lift may be considered. Alternatively lifting facilities must be included in the guarding design to prevent excessive manual handling, or guards may open on hinges.

3.3 Guarding Construction

Guarding shall be of robust construction and shall resist being easily damaged or deformed.

A guard may be constructed of sheet metal, rigid plastic material or may be made of wire mesh **painted black** (See Standard 1500-AP0-TSP-GMT-002 Equipment Paint Colours) within a rigid frame.

Mesh size for guarding shall comply with the relevant National/International Standards, but where possible the largest allowable mesh size is to be used, to prevent the build-up of dust/contamination that may 'blind' the mesh and prevent the ability to see through it.

3.4 Ease of Machine Maintenance

Guarding is essential for personnel safety, but careful design can avoid unnecessary maintenance obstruction.

In S-G, production personnel are trained to make simple machine inspections and carry out lubrication tasks. It should be made possible in equipment design to carry out these tasks without the need to remove guards.

The detailed Specification (**1500-AP0-TSP-GMT-013 Visual Standards Manual**) provides detailed examples associated with guarding and lubrication points, as well as other items related to equipment systems.

4. GUARDING FOR SPECIFIC EQUIPMENT

4.1 Circular Saws (plasterboard end saws)

Specific guards for circular saws shall be provided in line with appropriate national standards (for example **BS1870**).

4.2 Roller Conveyors

Particular attention shall be paid to roller conveyors where components are accessible to personnel.

The potential for a person being pulled into a roller conveyor at in-running nip points must be considered; even if these nip points are under the conveyor.

4.3 Belt Conveyors (including plasterboard forming conveyors)

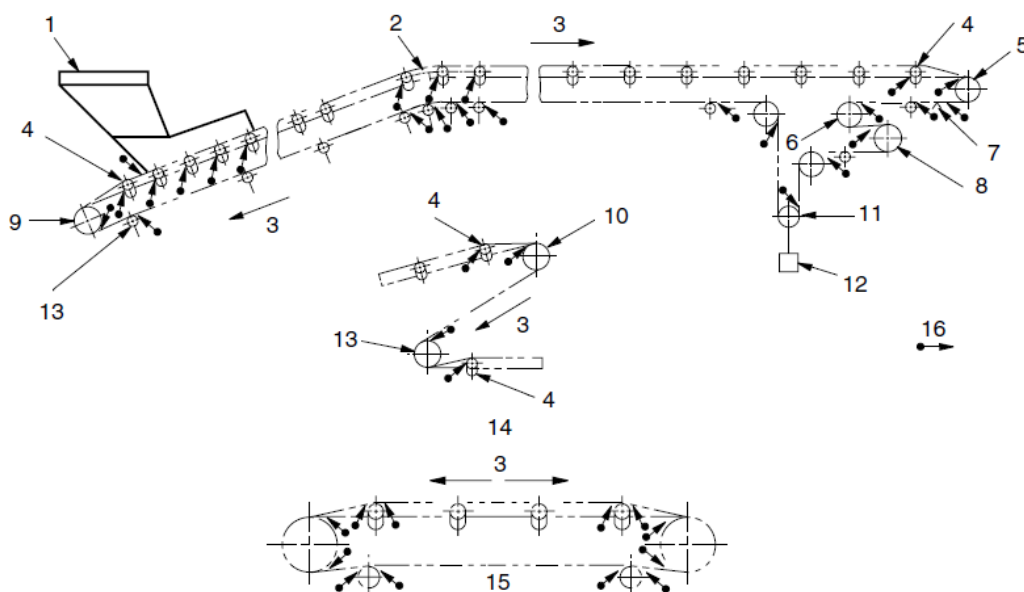
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In general, belt conveyor guarding specification are covered in **EN 620: Continuous Handling Equipment & systems**. Specific sections that S-G require focus from the Supplier on are detailed below.

For a belt conveyor any nip point between a belt and a roller (including return idler rollers) where the belt changes direction must be guarded.

EVS-EN 620:2002+A1:2010



Key

1	Feed hopper	9	Tail pulley
2	Idlers at convex curve (brow) position	10	Tripper discharge pulley
3	Direction of belt travel	11	Take up pulley
4	Transition idler	12	Gravity take-up weight
5	Head pulley	13	Bend pulley
6	Snub pulley	14	Typical tripper
7	Scraper	15	Reversible belt
8	Drive pulley	16	Nip point

Figure 1 – Typical nip points

For all other nip points, the belt must be free to move away from the roller for a minimum distance of 50 mm.

Each installation will need to be assessed for compliance with International and S-G standards and by risk assessment to ensure that they are safe.

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For these reasons, S-G may request further guarding to be added to a proposed design, or modifications made to existing guarding to ensure no additional risk is developed.

5. TESTING, COMMISSIONING AND MAINTENANCE PROCEDURES

No equipment shall be run or tested unless guarding is in place or details of alternative safety procedures have been agreed with S-G in writing and implemented.

The removal of guarding shall only be allowed under a permit to work or work authorisation system, a condition of which is that all motive power to the machine is isolated and locked in the off position.

6. Document Revision History

REVISION	DATE	CHANGES	By	Approved
F	11.11.21	Update to new format, Standard Referencing	T.Ecclestone	
E	17.02.16	Mesh guard colour update to black	N.Collis	
D	05.06.14	General update	S. Selby	

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